

Claims

1. A pharmaceutical formulation comprising fulvestrant in a ricinoleate vehicle, a pharmaceutically acceptable non-aqueous ester solvent, and a pharmaceutically acceptable alcohol wherein the formulation is adapted for intramuscular administration and attaining a therapeutically significant blood plasma fulvestrant concentration for at least 2 weeks.
2. A pharmaceutical formulation adapted for intra-muscular injection comprising fulvestrant, 30% or less weight of a pharmaceutically-acceptable alcohol per volume of formulation, at least 1% weight of a pharmaceutically-acceptable non-aqueous ester solvent miscible in a ricinoleate vehicle per volume of formulation and a sufficient amount of a ricinoleate vehicle so as to prepare a formulation which is capable after injection of attaining a therapeutically significant blood plasma fulvestrant concentration for at least 2 weeks.
3. A pharmaceutical formulation as claimed in claim 1 or 2 wherein the blood plasma fulvestrant concentration attained is at least  $2.5\text{ngml}^{-1}$  for at least 2 weeks..
4. A pharmaceutical formulation adapted for intra-muscular injection comprising fulvestrant, 30% or less weight of a pharmaceutically-acceptable alcohol per volume of formulation, at least 1% weight of a pharmaceutically-acceptable non-aqueous ester solvent miscible in a ricinoleate vehicle per volume of formulation and a sufficient amount of a ricinoleate vehicle so as to prepare a formulation of at least  $45\text{mgml}^{-1}$  of fulvestrant.
5. A pharmaceutical formulation as claimed in claim 1 to 4 which contains 25% w/v or less of a pharmaceutically-acceptable alcohol.
6. A pharmaceutical formulation as claimed in claim 5 which contains 20% w/v or less of a pharmaceutically-acceptable alcohol.
7. A pharmaceutical formulation as claimed in claim 5 which contains 15-25% w/v of a pharmaceutically acceptable alcohol.
8. A pharmaceutical formulation as claimed in claim 5 which contains 17-23% w/v of a pharmaceutically acceptable alcohol.

9. A pharmaceutical formulation as claimed in any claim from 1 to 8 which contains 60% w/v or less of a pharmaceutically-acceptable non-aqueous ester solvent.
10. A pharmaceutical formulation as claimed in claim 9 which contains 50%w/v or less of  
5 a pharmaceutically-acceptable non-aqueous ester solvent .
11. A pharmaceutical formulation as claimed in claim 9 which contains 45% w/v or less of a pharmaceutically-acceptable non-aqueous ester solvent.
- 10 12. A pharmaceutical formulation as claimed in claim 9 which contains 40% w/v or less of a pharmaceutically-acceptable non-aqueous ester solvent.
13. A pharmaceutical formulation as claimed in claim 9 which contains 35% w/v or less of a pharmaceutically-acceptable non-aqueous ester solvent.  
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14. A pharmaceutical formulation as claimed in claim 9 which contains 30% w/v or less of a pharmaceutically-acceptable non-aqueous ester solvent.
15. A pharmaceutical formulation as claimed in claim 9 which contains 25% w/v or less  
20 of a pharmaceutically-acceptable non-aqueous ester solvent.
- 16 A pharmaceutical formulation as claimed in claim 9 which contains 10-25% w/v of a pharmaceutically acceptable non-aqueous ester solvent.
- 25 17 A pharmaceutical formulation as claimed in claim 9 which contains 12-18% w/v of a pharmaceutically acceptable non-aqueous ester solvent.
- 18 A pharmaceutical formulation adapted for intra-muscular injection comprising  
fulvestrant, 15-25% weight of a pharmaceutically-acceptable alcohol per volume of  
30 formulation, 10-25 % weight of a pharmaceutically-acceptable non-aqueous ester solvent  
miscible in a ricinoleate vehicle per volume of formulation and a sufficient amount of a  
ricinoleate vehicle so as to prepare a formulation of at least  $45\text{mgml}^{-1}$  of fulvestrant.

- 19 A pharmaceutical formulation adapted for intra-muscular injection comprising fulvestrant, 17-23% weight of a pharmaceutically-acceptable alcohol per volume of formulation, 12-18 % weight of a pharmaceutically-acceptable non-aqueous ester solvent miscible in a ricinoleate vehicle per volume of formulation and a sufficient amount of a  
5 ricinoleate vehicle so as to prepare a formulation of at least  $45\text{mgml}^{-1}$  of fulvestrant.
20. A pharmaceutical formulation as claimed in any claim from 1 to 19 wherein the pharmaceutically-acceptable alcohol is a mixture of ethanol and benzyl alcohol.
- 10 21. A pharmaceutical formulation as claimed in any claim from 1 to 20 wherein the pharmaceutically-acceptable non-aqueous ester solvent is selected from benzyl benzoate, ethyl oleate, isopropyl myristate, isopropyl palmitate or a mixture of any thereof.
22. A pharmaceutical formulation as claimed in any claim from 1 to 21 wherein the  
15 pharmaceutically-acceptable non-aqueous ester solvent is benzyl benzoate.
- 23 A pharmaceutical formulation adapted for intra-muscular injection comprising fulvestrant, 15-25% weight of a pharmaceutically-acceptable alcohol per volume of formulation, 10-25 % weight of benzyl benzoate in a ricinoleate vehicle per volume of  
20 formulation and a sufficient amount of a ricinoleate vehicle so as to prepare a formulation of at least  $45\text{mgml}^{-1}$  of fulvestrant.
- 24 A pharmaceutical formulation adapted for intra-muscular injection comprising fulvestrant, 17-23% weight of a pharmaceutically-acceptable alcohol per volume of  
25 formulation, 12-18 % weight of benzylbenzoate in a ricinoleate vehicle per volume of formulation and a sufficient amount of a ricinoleate vehicle so as to prepare a formulation of at least  $45\text{mgml}^{-1}$  of fulvestrant.
- 25 A pharmaceutical formulation according to claim 23 or 24 wherein the  
30 pharmaceutically-acceptable alcohol is a mixture of ethanol and benzyl alcohol.
- 26 A pharmaceutical formulation according to claim 25 wherein the ethanol and benzyl alcohol are present at about equal % weight per volume of formulation.

27. A pharmaceutical formulation as claimed in any claim from 1 to 26 wherein the total volume of the formulation is 6ml, or less, and the concentration of fulvestrant is at least  $45\text{mgml}^{-1}$ .

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28. A pharmaceutical formulation as claimed in any claim from 1 to 27 wherein the total amount of fulvestrant in the formulation is 250mg, or more, and the total volume of the formulation is 6ml, or less.

10 29. A pharmaceutical formulation as claimed in claim 28 wherein the total amount of fulvestrant in the formulation is 250mg and the total volume of the formulation is 5 to 5.25ml.

30. A pharmaceutical formulation as claimed in any of claims 1-29 wherein the pharmaceutically-acceptable alcohol is a mixture of 10% weight of ethanol per volume of  
15 formulation, 10% weight of benzyl alcohol per volume of formulation, and the formulation contains 15% weight of benzyl benzoate per volume of formulation and the ricinoleate vehicle is castor oil.

31. A pharmaceutical formulation adapted for intramuscular injection, as defined in any  
20 claim from 1 to 30, for use in medical therapy.

32. Use of fulvestrant in the preparation of a pharmaceutical formulation, as defined in any claim from 1 to 30, for the treatment of a benign or malignant disease of the breast or reproductive tract.

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33. A syringe or vial containing a pharmaceutical formulation as defined in claim 30.

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